

**BIOSPHERIC SCIENCES BRANCH HIGHLIGHTS**  
March – April 2011

**Accepted Papers:**

Douglas C. Morton (614.4), Ruth DeFries (Columbia), Jyoteshwar Nagol (UMD), Carlos Souza (Imazon), Eric Kasischke (UMD), George Hurtt (UMD), and Ralph Dubayah (UMD). Mapping Canopy Damage from Understory Fires in Amazon Forests Using Annual Time Series of Landsat and MODIS Data. *Remote Sensing of Environment*, accepted.

Dr. Molly Brown (Code 614.4) and coauthors Daniel Osgood from Columbia University and Miguel Carriquiry, University of Iowa, will have a commentary published in *Nature Geosciences* next month. The article, entitled 'Science-based Insurance' focuses on the need for improved interaction between earth scientists and those who develop crop insurance in developing countries. Index insurance is a product that provides a payout depending on the exceedance of a threshold variable such as water level (for floods) or days without rain (for droughts). Regions with poor weather and climate information locally will need to use satellite remote sensing in order to make index insurance viable. For more information, please contact Molly Brown at [molly.brown@nasa.gov](mailto:molly.brown@nasa.gov).

Brown ME (614.4), Osgood DE (Columbia), Carriquiry MA (Iowa State). Science-based Insurance. *Nature Geoscience*, in press.

**External Interactions:**

The Terra Project Science Office and Science team provided near real-time data sets from ASTER, MODIS and MISR of the earthquake affected areas of Japan including the tsunami ravaged coastline. MODIS and MISR provided some of the first post-quake images recorded by satellite and showed large areas of coastal inundation. The Project continues to support NASA HQ as the situation unfolds. For example, Terra's MISR instrument may be useful for estimating plume vector and injection heights should that be required in the monitoring of Japan's damaged nuclear power plants. Data are provided to NASA HQ as part of Terra's response to the call for EO missions to support Operational Uses and National Applications. The Terra Project Science Office is also helping mission operations cover for the Japanese ASTER instrument operation teams (IOT). The Japan ASTER IOT staff were forced to evacuate their operations control center due to the condition of the Fukushima nuclear power facility. For more information, contact Dr. Marc L. Imhoff, Terra Mission Scientist, 614.4 ([Marc.L.Imhoff@nasa.gov](mailto:Marc.L.Imhoff@nasa.gov)).

Dr. Lola Fatoyinbo (614.4) attended the 'Workshop on Tropical Wetland Ecosystems of Indonesia' in Bali, Indonesia from April 11-14. The meeting was organized by the USDA Forest Service, USAID, and the Center for International

*Tropical Forestry (CIFOR). Tropical wetlands, especially peatland forests and mangroves, are highly productive and harbor a unique assemblage of aquatic and terrestrial biodiversity. Because of the accumulation of Carbon over several millennia, these ecosystems are among the largest terrestrial C pools on Earth, yet the rates of deforestation in these ecosystems are among the highest on earth. Therefore, their roles in climate change mitigation and adaptation are highly significant. The purpose of the workshop was to bring together Indonesian and international scientists with diverse backgrounds and experiences in both freshwater and coastal tropical wetlands to describe the state of the science, significant research needs, and potential comprehensive multidisciplinary approaches necessary to implement climate change adaptation and mitigation strategies. An important outcome of this workshop was to provide information and a blueprint for the development of the international REDD+ mechanism in wetlands most likely through IPCC processes. Dr. Fatoyinbo gave an invited presentation entitled "Remote Sensing of mangrove structure and biomass."*

*Eric Brown de Colstoun (614.4/610) recently participated in "Career Day" at Eleanor Roosevelt High School in Greenbelt MD. Dr. Brown de Colstoun spoke to 3 large groups of 9-11th graders about NASA Science/Technology focusing on Earth Science, remote sensing and geospatial technologies. The talks and discussions also highlighted the diversity of backgrounds needed to build successful mission teams and the various careers pathways related to NASA's work.*

*Dr. Molly Brown (614.4) was an invited speaker at the annual conference of the Association of American Geographers in Seattle, WA, where she presented a research paper entitled, 'Childhood malnutrition in West Africa: linkages between environment, markets and development' with coauthors Kirsten Johnson of ICF Macro International and Tim Essam, University of Maryland. Dr. Brown also participated in two panel discussions. The first, entitled 'Beyond the Ivory Tower: Preparing Geographers for Public Sector Careers', focused on opportunities for geographers in federal, state and local government roles. The second panel, 'Climate change and development: Intersections, Contradictions and Opportunities', also included Edward Carr, University of South Carolina; Diana Liverman, University of Oxford; Joni Seager, Bentley University; and Anthony Bebbington, Clark University.*

*The Carbon Monitoring System Science Definition Team met at GSFC on March 23-24, 2011. NASA's Carbon Cycle & Ecosystems Office, which is hosted by Code 614.4, provides scientific and program support for the Carbon Monitoring System (CMS) led by HQ Managers Jack Kaye, Diane Wickland, Kenneth Jucks, and Bradley Doorn. CC&E Office staff facilitated logistics and web support for the first meeting of the CMS Science Definition Team (SDT). GSFC scientists play leadership roles in all aspects of NASA's CMS, in collaboration with*

scientists from other NASA Centers, Agencies, and various universities. Drs. Jeff Masek, Forrest Hall (JCET), Ross Nelson, Bruce Cook, Jackie Rosette [GEST], Lola Fatoyinbo [all Code 614.4], and Compton Tucker [Code 600], presented progress on the CMS Biomass Pilot Project. Drs. Jim Collatz [Code 614.4], Randy Kawa (Code 613.3), Steve Pawson [Code 610.1], Watson Gregg [Code 610.1] and Lesley Ott [Code 610.1] represented the CMS Flux Pilot Project. Dr. Molly Brown [Code 614.4] serves on the CMS Science Definition Team, with science support from Vanessa Escobar [Code 614.4, Sigma Space Corporation]. Drs. Peter Griffith [Code 614.4, Sigma Space Corporation] and Compton Tucker [Code 600] represent Goddard on the CMS Steering Committee. More about the NASA Carbon Monitoring System may be found at: <http://cce.nasa.gov/cce/cms/index.html>

Eric Brown de Colstoun (614.4/610) led an education session with 250 Environmental Education students from Bowie High School in Bowie MD. The event was coordinated by the Prince George's County MD Teachers, Goddard's Office of Education, and the National Commission on Teaching and America's Future (NCTAF). In his lecture, Dr. Brown de Colstoun highlighted NASA's unique role in Science and Earth Science and the diverse career opportunities at NASA. In the coming weeks, 11th and 12th grade students will be involved in field work to validate products from Dr. Brown de Colstoun's NASA-funded project to map global urbanization using Landsat data. For more information contact Eric Brown de Colstoun, Code 614.4, 4-6597, [eric.c.browndecolsto@nasa.gov](mailto:eric.c.browndecolsto@nasa.gov)

Dr. Elizabeth Middleton (614.4) participated in a 2-day workshop that addressed the potential uses of HyspIRI data for input to regional and global models in order to increase understanding of climate-biosphere feedbacks. The meeting was sponsored by NASA HQ (Dr. Michael Freilich), hosted by Dr. Chris Field (Stanford) and Dr. Susan Ustin (Univ. California-Davis), and held at the Carnegie Institute (Stanford University, Palo Alto, CA) on Feb. 23-24, 2011. For more information, contact Dr. Elizabeth Middleton, Code 614.4, [Elizabeth.middleton@nasa.gov](mailto:Elizabeth.middleton@nasa.gov)

Dr. Molly Brown (614.4) and Megan McGroddy (Sigma Space) met with three students from Smith College on March 4th on a project to improve the Urban Forest Effects Model (UFORE) of the US Forest Service using satellite data and model parameters from Biome-BGC. Funded through the Climate Adaptation Science Investigation (CASI) team for Goddard, this project focuses on linking Biome-BGC and UFORE for improved understanding of the benefits of trees in urban environments, such as energy savings, carbon sequestration, and reducing air pollution. The team expects to write two papers for peer reviewed journals this spring in collaboration with UFORE and Biome-BGC scientists David Nowak (US Forest Service) and Cristina Milesi (NASA Ames Research

Center). For more information, contact Dr. Molly Brown, Code 614.4, [molly.brown@nasa.gov](mailto:molly.brown@nasa.gov)

Dr. Jon Ranson (614.4) and Dr. Jeff Masek (614.4) attended the first joint meeting of the Oak Ridge National Laboratory (ORNL) DAAC and the Land Processes DAAC Users Working Groups (UWGs) in Annapolis March 9 -10. The meeting focused on what science can be facilitated by combining data products and services from the two DAACs and how should the two DAACs work together to better serve the community. Dr. Ranson and Dr. Masek are both members of the ORNL DAAC UWG. For more information, contact Dr. Jon Ranson, 614.4, [kenneth.j.ranson@nasa.gov](mailto:kenneth.j.ranson@nasa.gov)

Jeff Masek (614.4), Brian Markham (614.4), and Jim Irons (613) attended the USGS Landsat Science Team meeting in Phoenix AZ during March 1-3. The meeting focused on the status of LDCM and planning for Landsat-9. Brad Doorn and Garik Gutman were also in attendance, representing NASA HQ.

Dr. Molly Brown (614.4) attended the National Science Foundation's Advisory Committee on Environmental Research & Education (AC-ERE) March 2011 Meeting in Arlington, VA. This group serves both as an internal advisory group and an investment design team whose primary responsibilities are to provide communication support for the broad ERE Portfolio and to identify areas of opportunity for future investment (e.g., the Biocomplexity in the Environment Initiative). Dr Brown has been a member of the committee since 2010. For more information, contact Dr. Molly Brown, Code 614.4, [molly.e.brown@nasa.gov](mailto:molly.e.brown@nasa.gov)

### **Funded Proposals**

Drs. Bruce Cook (614.4), Douglas Morton (614.4), Guoqing Sun (UMCP-614.4), and collaborators at the Centre d'Etudes Spatiales de la Biosphère (CESBIO) in Toulouse, France, were awarded a three-year grant under the ROSES 2009 Remote Sensing Theory for Earth Science announcement. The project, "DART-LiDAR: A Coupled Atmosphere-Vegetation Model for Simulating Full-Waveform and Photon-Counting LiDAR," will evaluate the complementary nature different LiDAR technologies for measurements of forest structure, with an emphasis on issues of data continuity between ICESat-I and ICESat-II.

### **Published Papers**

Smirnov, A. (Sigma Space-614.4), B.N.Holben (614.4), D.M.Giles (Sigma Space-614.4), I.Slutsker (Sigma Space-614.4), N.T.O'Neill, T.F.Eck (UMBC-614.4), A.Macke, P.Croot, Y.Courcoux, S.M.Sakerin, T.J.Smyth, T.Zielinski, G.Zibordi, J.I.Goes, M.J.Harvey, P.K.Quinn, N.B.Nelson, V.F.Radionov, C.M.Duarte, R.Losno, J.Sciare, K.J.Voss, S.Kinne, N.R.Nalli, E.Joseph, K.K.Moorthy, D.Covert, S.K.Gulev, G.Milinevsky, P.Larouche, S.Belanger, E.Horne, M.Chin, L.A.Remer, R.A.Kahn, J.S.Reid, M.Schulz, C.L.Heald, J.Zhang, K.Lapina,

*R.G.Kleidman, J.Griesfeller, B.J.Gaitley, Q.Tan, and T.L.Diehl. Maritime Aerosol Network as a component of AERONET – first results and comparison with global aerosol models and satellite retrievals, Atmos. Meas. Tech., 4, 583–597, 2011.*

### **Submitted Proposals**

*The Terra Project Science Office and Science Team also completed and submitted a proposal for mission extension in response to the 2001 Senior Review. The proposal reviews the science justification, recent accomplishments, future science activities, operations, and the engineering status of the mission and Terra's five instruments; ASTER, CERES, MISR, MODIS, and MOPITT. With five science teams, six different institutions (including Canadian and Japanese agencies) creating 77 calibrated and validated data products covering all six science focus areas for NASA Earth science plus Operational Uses and Applications, Terra is one of the larger EO missions. For more information, contact Dr. Marc L. Imhoff, Terra Mission Scientist, 614.4 ([Marc.L.Imhoff@nasa.gov](mailto:Marc.L.Imhoff@nasa.gov)).*

*The EO-1 2011 Senior Review Proposal was submitted on March 4, 2011. The proposal described the science support and technology activities that have been accomplished over the past ten years, with emphasis on the last two year funding cycle. Justification for continuation funding was provided, with five specific task categories identified for FY12-13+: 1] expanding time series acquisitions, including those that support HypsIRI; 2] investigating the synergy of night/day Hyperion pairs for the study of wildfires; 3] studying the effects on signal-to-noise ratio and data quality changes due to earlier local overpass time (< 10AM at equator) with precession after fuel depletion; 4] studying, in partnership with NOAA, the monthly lunar calibration data for ALI and Hyperion to develop a revision to ROLO (RObotic Lunar Observatory)—the calibration standard currently used by many satellite sensors; and 5] supporting cal/val efforts for Landsat-8 with ALI data in the first year after launch (2013-2014). The proposal also advocates continuing activities undertaken in the last two year period (2009-2010). In addition, the technology augmentations and automated processing tasks that have reduced mission costs will continue. For more information, contact Dr. Elizabeth Middleton, EO-1 Mission Scientist, 614.4, [Elizabeth.middleton@nasa.gov](mailto:Elizabeth.middleton@nasa.gov)*